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THE OCHTERIDAE (HEMIPTERA) OF THE WESTERN HEMISPHERE

DOROTHYDEAN VIETS SCHELL, Lawrence, Kansas

[Continued from the January issue]

Ochterus hungerfordi, n. sp.

Size.—4 mm. in length; 2 mm. in width.

Color.—Dorsum black with the usual bluish-grey markings and short golden flecks. Expanded lateral margins of the pronotum straight and yellowish. Frons slightly carinate between the eyes, metallic green and finely rugulose. Venter of thorax pruinose; venter of abdomen pubescent. Acetabulae, legs, first and second antennal segments, yollowish. Labrum and rostrum brown.

Structural characteristics.—Width of base of pronotum twice that of apex. Interocular space equal in width to width of eye from face view. Antennae not extending to margin of pronotum. Third and fourth antennal segments subequal in length; fourth slightly larger in diameter.

Genital armature.—The genital capsule has a narrow pointed tip that extends almost to the tip of the right paramere. The right paramere is expanded about one-fourth of distance from tip to bend, being almost twice as wide as at the apical part. (Fig. 2).

Comparative notes.—This species resembles **O. viridifrons** and **O. acutangulus** in having the frons metallic green. However, each of these species has large protruding eyes, and lemon yellow labrum and rostrum, while the eyes of **O. hungerfordi** are normal size and the labrum and rostrum are brown.

Distributional notes.—The type of this species is deposited in the Francis Huntington Snow collection. It was collected by P. J. Bermudez, 1932, in Mantanzas, Mumuri Valley, Cuba. Holotype ♂; allotype and two paratypes. One female specimen was examined from the United States National Museum from Baracoa, Cuba.

Ochterus viridifrons (Champion)

Champion, 1901, Biologica Centrali-Americana, Rhynchota, Vol. II, pp. 345-346, pl. 20, fig. 14.

"Broad ovate, black; the head from the ocelli forwards shining and of a brilliant metallic-green color, the rest of the surface opaque; the labrum and antennae, the sides of the pronotum narrowly, except at the lateral angles, the outer margin of the corium, the rostrum, some marks on the pleura, and the coxae ochreous, the basal margin of the pronotum and the claval suture inclining to

ferruginous, the pronotum, scutellum, and elytra also with some irregular bluish-gray markings; the legs infuscate, with the base of the femora ochreous, in one specimen almost entirely ochreous; the upper surface with very minute scattered golden scales, the under surface with a bluish-white pubescence. Face densely, irregularly rugulose, carinate between the eyes; the latter large, very prominent in the male, less so in the female. Pronotum, scutellum and elytra sparsely distinctly punctate; pronotum short, nearly twice as wide at the base as at the apex, the sides somewhat rounded and converging from the base, the anterior angles completely effaced, the lateral angles subacute and projecting a little beyond the elytra; elytra widening to near the middle; nervures of the membrane indistinct. Fifth ventral segment carinate down the center in the male.

Length.—4.25-5.5 mm. Breadth 2.5-3.1 mm: (♂ ♀):

"Habitat.—Guatemala, Rio Naranjo, San Geronimo (Champion). A male from Rio Naranjo and a female from San Geronimo, the latter much the larger of the two, and with the legs almost entirely pale, the ochreous lateral streaks on the pronotum become, as usual, a little wider forwards."

Comparative notes: This species is remarkably similar to **Ochterus acutangulus.** In our series from Costa Rica, **O. viridifrons** has the lateral margins of the pronotum arched, while those of **O. acutangulus** are straight. However, a series from Canal Zone, Panama from Doctor C. J. Drake's collection, undoubtedly **viridifrons,** have the margins straight.

Genital armature: The most accurate method of separating these two species (**viridifrons** and **acutangulus**) is by genital characters. The right paramere of **viridifrons** has a sharp curved tooth on the inner margin, giving it the appearance of an asymmetrical spear. (Fig. 3). The right paramere of **acutangulus** is club-shaped, without teeth.

Distributional notes: The Francis Huntington Snow collection contains a series of twenty-six specimens from the San Jose, Costa Rica. One female specimen from the United States National Museum, bearing a Grand Canyon, Arizona label, appears to be **viridifrons,** but an examination of the male genitalia would be necessary for accurate determination. Specimens from Canal Zone, Panama were studied from Doctor C. J. Drake's collection.

Ochterus acutangulus (Champion)

Champion, 1901, Biologica Centrali-Americana, Rhynchota, Vol. II, pp. 345-346, pl. 20, figs. 15, 15a.

"♀—Broad ovate, flattened above, much narrowed behind, black; the head from the ocelli forwards shining, and of a brilliant metallic-green color in front, changing to cuprous between the eyes, the rest

of the surface opaque; the labrum, the two basal joints of the antennae, the rostrum, the sides of the pronotum narrowly, except at the lateral angles, the outer margin of the corium, some marks on the pleura, and the coxae, ochreous, the basal margins of the pronotum ferruginous, the elytra with indications of the usual bluish-grey markings; the under surface with a bluish-grey pruinosity, the legs and abdomen with a bluish-white pubescence; the legs infuscate, the femora beneath and at the base ochreous. Head punctured behind the ocelli, the face densely, irregularly rugulose in front, the interocular space carinate down the middle and almost smooth; eyes comparatively small, not prominent. Pronotum, scutellum, and elytra very distinctly punctured, pronotum short, about twice as wide at the base as at the apex, the sides almost straight, the anterior angles completely effaced, the lateral angles acute and projecting beyond the elytra; elytra narrowing from a little below the base; nervures of the membrane prominent. Legs long and slender.

"Length.—5 1/8, breadth 2 4/5 mm.

"Habitat: Guatemala, Rio Naranjo (Champion).

"One specimen from the banks of the River Naranjo in the 'tierra caliente' of the Pacific coast region. Easily separable from its allies by the acute lateral angles of the pronotum, the almost smooth interocular portion of the head, and the posteriorly narrowed elytra."

Comparative notes: As mentioned previously, this species bears a close resemblance to **viridifrons**, but can easily be separated by the club-shaped right paramere. The lateral margins of the pronotum of this species are straight while those of **viridifrons** are arched.

Genital armature: The tip of the capsule is rounded; the paramere is rather long and club-shaped. (Fig. 4).

Distributional notes: In the Francis Huntington Snow collection are found specimens from Tejupilco, Mexico and Vera Cruz, Mexico. I also examined a specimen from the United States National Museum collected in Porto Bello, Panama. This single specimen, a female, has been determined as **acutangulus** by Mr. H. G. Barber. It is slightly smaller than our specimens from Mexico, and the sides are more nearly parallel. However, it has the same green frons, yellow labrum, and acute humeral angles.

Ochterus parvus n. sp.

Size.—Length 3.3 mm.; greatest width 1.5 mm.

Color.—Dorsum strikingly reddish-brown with short golden flecks. Frons slightly darker than dorsum. Underside also brownish. Legs, acetabulae, labrum, rostrum and lateral margins of the pronotum yellowish.

Structural characteristics.—Anterior and humeral angles of the

pronotum rounded. Lateral margins gently curved. The entire lateral margin of the pronotum expanded and broadly pale. Frons slightly carinate between the eyes; frons finely rugulose. The eye width is slightly less than twice that of the interocular space as viewed from face aspect.

Genital armature: The right paramere bears a single small lobe on the outer margin near the tip. As is only logical, considering the size of the specimen, the genital capsule is quite small in comparison to other species.

Comparative notes.—This species is one of the most distinctive of the genus. Its light rich brownish color and it extremely small size make it easily separated from its allies. The right paramere shows a slight resemblance to that of **perbosci**; however, the capsule is much smaller and the paramere bears a single, barely-enlarged lobe on the outer margin. Externally they differ greatly, **parvus** being half the length of **perbosci** and brown rather than black.

Distributional notes.—Described from one male specimen collected by F. X. Williams, at Mera, Ecuador in 1923. The type is deposited in the Francis Huntington Snow collection.

Ochterus flaviclavus Barber

Barber, 1913, Canadian Entomologist XLV, p. 214.

"Brownish-black. Very much the appearance of **O. americanus**, to which it is closely related, having the usual carinate and ruglose face. However, somewhat smaller than that species with the clavus entirely yellow. The pronotum with the lateral margins gently rounded, more converging anteriorly, the anterior margin being narrower than the width across the eyes; the anterior angle of the pronotum sharply rounded and not projecting anteriorly as in **americanus**; the expanded part of lateral margins narrower, with a small yellowish spot just posterior to the anterior angle; the humeral angle almost rectangular, projecting but a trifle beyond margin of corium. Extreme edge of corium very narrowly pale but the usual pearl-grey spots. Beneath, with the sternum slate grey; the acetabula, posterior and lateral flange of the posternum, legs and venter pale: legs light infuscated. Prosternum, mesosternum externally and metasternum before the posterior angle distinctly punctate.

"Length.—3.5 mm.; width of pronotum, about 2 mm."

Described from male taken at Ormond, Florida.

Comparative notes: This species is apparently closely related to **O. americanus** as it bears the same small yellow spot on the margin of the pronotum. However, the lemon yellow clavus of this species readily separates it from other Ochteridae.

Genital armature: The type of this specimen was kindly loaned to me by Mr. H. G. Barber from his own private collection. The paramere and capsule are remarkably similar to that of **banksi**.

Although I can discern no specific structural differences in the paramere of **flaviclavus** and **banksi**, I am retaining it as a distinct species due to its unique color pattern. The genital capsule is illustrated in this paper. (Fig. 6).

Distributional notes: The type specimen was collected at Ormond, Florida. W. S. Blatchley (Heteroptera or True Bugs of Eastern North America, 1926, p. 1022) reports taking one female of this species at Sarasota, Florida beneath the decaying stems of pickerel-weed growing in the muck of a nearly dry wet-weather pond in open pine woods.

Ochterus brunneus Hungerford

Hungerford, 1927, Proc. Ent. Soc. Wash., 29, p. 188.

"Size.—length, 4.8 mm. Width across head, 1.4 mm. greatest width, 2.5 mm.

"Color.—the general color impression, brown. Head black above. Disc of pronotum, scutellum and membrane of hemelytra, smoky-black with flecks of grey on scutellum and membrane. Lateral margin of pronotum and embolium yellowish. Remainder of dorsal surface, rich brown flecked with bluish-grey. A smoky patch on each corium and bluish-grey figure at median base and tip of scutellum and five imperfectly quadrate spots on hemelytral margin. Entire surface sparsely covered with short golden hairs. Body beneath, dark frosted with grey. Legs and antennae, nearly white.

"Structural characteristics.—Anterior tibia of male curved. Vertex of head not carinate. Anterior margin of pronotum narrower than the head. Lateral margins somewhat explanate and divergent. Third and fourth segments of antennae slender, the antennal formula being, 2d:3d:4th::5:11:11. Terminal segment slightly curved. Distal end of second segment fully twice the diameter of the third segment reaching the lateral margin of the prothorax."

Comparative notes: This species resembles **O. barberi** but it is separated from it by the distinctly ferruginous color on the posterior half of the pronotum. In **barberi** the pronotum is black and the corium is usually considerably darker than that of **brunneus.**

Genital armature: The tip of the capsule extends almost to the tip of the paramere. The right paramere bears two knobs on the inner margin. (Fig. 7).

Distributional notes: Described from two males bearing the label, "Huachi Rio Beni, Boliv. W. M. Mann. Sept. Mulford Biol. Expl. 1921-22." These specimens are in the Francis Huntington Snow collection to be returned to the United States National Museum.

Ochterus barberi n. sp.

Size.—Length 5 mm. Width 2.5 mm.

Color.—The general color impression is brown to brownish-black; the pronotum is black with a ferruginous spot at the posterior end of the yellowish marginal splotch. A narrow band of ferruginous appears at the posterior margin of the pronotum in the center. The scutellum is black; the hemelytra are rich brown to ferruginous, and bear indications of two spherical yellow spots on the inner apical angles. These spots seem to vary in their degree of coloration in the various specimens. The hemelytra bear a series of yellow spots on their external margins. The labrum and rostrum are black, and the entire underside is black or dark brown.

General armature: The right paramere is very unique. It barely protrudes from the capsule. It has a tooth on the inner margin and the outer margin is very slightly serrate for a considerable distance from the tip. The aedeagus also is slightly serrate at the base. The rather large genital capsule is figured. (Fig. 8).

Comparative notes.—This species resembles **brunneus** but does not have the ferruginous coloration on the posterior half of the pronotum. It resembles **perbosci** as it has the same series of yellow spots along the external margin of the hemelytra, but it is smaller and does not bear the pointed projections at the anterior angles of the pronotum.

Distributional notes.—The holotype and allotype are deposited in the United States National Museum. The holotype, a male, was taken at Colorado Canyon, Arizona; the allotype at Hot Springs, Arizona. Another specimen in the National Museum bears the label, Orizaba, Mexico. Two specimens, paratypes, were received from the American Museum of Natural History, collected at Grand Canyon, Arizona. A series of 61 paratypes were collected at Indian Hot Springs and Castle Hot Springs, Arizona by Doctor R. H. Beamer and his collecting party in August, 1941. They are now in the Francis Huntington Snow collection.

Ochterus americanus (Uhler)

Uhler, 1884, Standard Natural History, ii, p. 262.

"Our native species, **P. americanus**, is a velvety blue, black beneath, marbled with deep black above and sprinkled with golden yellow points; the face is coal black and the rostrum piceous. Each side of the prothorax, behind the front angles, there is a bright yellow spot of variable size; the prothorax is transverse, but a little narrower than the abdomen, and the lateral margins are depressed and thin, on the costal margin of the corium five not very distinct yellow spots appear. The legs are slender, dull yellow, tinged with piceous, and the knees, tips of the shanks, and ends of the tarsi are pitch brown. This is a gay active little insect, which measures only one-fourth of an inch in length, and lives among the grass and weeds on the margins of brooks and ponds from Massachusetts to

Texas. It is also not uncommon in the island of Cuba. It differs from the very similar European species in being narrow in front, and in lacking the spots on the underside of the connexivum."

Comparative notes: This species is closely related to **banksi**, but has only a single spherical spot on the lateral margin of the pronotum. It differs from **flaviclavus** by the black hemelytra mottled with bluish-grey.

Genital armature: The genital capsule has a distinct lobe or scallop near the tip. The right paramere is broadened apically with a rather blunt tip; it also bears a tooth on the outer margin. (Fig. 9).

Distributional notes: The Francis Huntington Snow collection has only two specimens, one, a female, collected at White Plains, N. Y., the other, a male, from Mosholu, N. Y. Specimens from Cedar Bluff, Neb., Aberdeen, Miss., and "N. Ill." were examined from Doctor C. J. Drake's collection.

Ochterus aenifrons (Champion)

Champion, 1901, Biologica Centrali-Americana, Rhynchota, Vol. II, pp. 344-345, pl. 20, figs. 12, 13.

"Broad ovate, black; the head from the ocelli forwards more or less shining and aeneous in color, the rest of the surface opaque; the pronotum with the sides rather broadly, except at the lateral angles, and basal margin in the middle, the corium usually with from two to four small spots on the outer margin, as well as the outer edges, and often a spot near the inner apical angle, and some marks on the pleura, ochreous; the head, pronotum, and scutellum with the usual irregular bluish-grey markings; the rostrum broadly black at the base, for the rest ochreous; the legs ochreous, in some specimens slightly infuscate; the upper surface with very minute scattered golden scales, the under surface with a bluish-grey pruinosity, the abdomen with a bluish-white pubescence. Face densely rugulose. not carinate between the eyes, the latter moderately large. Pronotum, scutellum, and elytra, sparcely indistinctly punctate; pronotum, about one-half wider at the base than at the apex, the sides slightly arcuate, the anterior and lateral angles rounded, the latter not projecting beyond the elytra; elytra somewhat rounded at the side; nervures of the membrane distinct.

"Length.—3.5-5 mm. Breadth 2-2.5 mm. (♀ ♂).

"Habitat.—Mexico, Teapa in Tabasco, (H. H. Smith); Guatemala, San Geronimo, Guatemala City (Champion); Panama, Tole, Pena Blanca, San Feliz (Champion). Antilles, Grenada, S. Vincent.

"Apparently a common species in Central America, whence we possess twenty-four specimens. It is very variable in size and color, some specimens having the disc of the elytra more or less ferruginous. The ochreous lateral patches on the pronotum often have a

short dark marginal streak. Differs from **O. perbosci** (which also is without a well-defined carina between the eyes) in the rounded anterior angles of the pronotum, the larger ochreous patches at its sides, the less distinctly spotted margins of the elytra, and the smaller size, and from the Palaearctic **O. marginatus** (Latr.), in the anteriorly narrowed pronotum, the narrowed head, the noncarinate face, the black labrum, etc."

Comparative notes: The author has presented a comparison of this species with **O. perbosci.** It seems to resemble closely **bidentatus** n. sp. and can be separated accurately only by the examination of the genitalia.

Genital armature: The right paramere has a distinct hook at the tip, and the shaft is simple. (Fig. 10).

Distributional notes: The Francis Huntington Snow collection has specimens from the following localities: Mexico, Costa Rica, Panama, Honduras, Ecuador, Guatemala, and Colombia, South America. Apparently this is common species in Central America. Doctor C. J. Drake has several specimens from Trinidad.

Ochterus bidentatus n. sp.

Size.—Length 4.7 mm. Width 2.4 mm.

Color.—The general color impression is black. Pronotum with broadly-expanded lateral margins yellowish darkening to ferruginous at the humeral angles. A touch of ferruginous is present at the posterior margin of the pronotum. The lateral margin of hemelytra ferruginous; entire surface covered with short golden flecks. Body beneath dark, with acetabula, lateral margin of thorax, legs and distal portion of rostrum yellowish. Base of rostrum black, as are the clypeus and labrum.

Structural characteristics: Frons non-carinate, but finely rugulose. Third antennal segment longest; distal end of second segment fully twice the diameter of third. Fourth as slender as third and about four-fifths as long.

Genital armature: The right paramere has several acute-angled notches on the inner margin which give the appearance of teeth. The tip of the genital capsule extends well up toward the tip of the paramere. (Fig. 11).

Comparative notes: This species closely resembles **aenifrons,** but the right paramere of **bidentatus** bears two sharp teeth on the inner margin, and does not have the hook at the tip.

Distributional notes: Holotype male; allotype and a female paratype from Vic. San Pedro, Peru, collected by Woytkowski. One male paratype bears the locality label "Dept. Ayacucho, Prov. La Mar Sivia, Jungle 790 m. a. s. 1. Bks. Apurimac riv." and was collected in Peru by F. Woytkowski. The types are deposited in the Francis Huntington Snow collection.

Ochterus banksi Barber

Barber, 1913, Canadian Entomological xlv, p. 214.

"Broad ovate, brownish black. The head, behind the vertex, opaque, from there anteriorly, shining and obliquely, finely rugulose and tricarinate; one carina next each eye, and a median one, continuous from vertex to apex; transversely sulcate midway between ocelli and base of head. Pronotum with anterior margin almost truncated, with the anterior angles next the eyes rounded and not projecting forwards or outwardly beyond the exterior margin of the eyes; entire lateral margins gently rounding posteriorly; humeral angle rounded, not very prominent; lateral margins broadly expanded, pale; and tapering posteriorly to occupy the entire margin; the remainder of the surface brownish black, elevated and transversely, but not very deeply sulcate a very little behind the middle; posterior lobe, middle and anterior part of first lobe more coarsely punctate, the latter with two or three transverse weak furrows. Scutellum almost equilateral, rather coarsely punctate and transversely furrowed; anteriorly with a transverse elevated ridge, behind which it is depressed. Corium not demarked from membrane, broadest across the middle, with lateral margin gently rounded to just beyond the middle, where it more abruptly rounds off to the rather narrow apical part of membrane; the external margins either broadly pale throughout or in part suffused with fuscous and reflexed, without the usual series of pale marginal spots which occur in O. **americanus**. Clavus and corium, anteriorly, with coarse scattered punctures. Nervures of the membrane indistinct. General surface with indication of customary bluish-grey markings, unless denuded, when the whole upper surface is smooth and shining. Beneath on sternum and venter, paler, with rostrum, acetabulae, coxae, legs and external angle of metathorax pale yellow. Prosternum rather coarsely punctate.

"Length, 4 mm. Width of pronotum, 2 mm.

"O. **banski** can readily be separated from **americanus** by its difference in color markings and the character of the pronotum. Apex of membrane is more narrow than in **americanus**.

Comparative notes: Mr. Barber has distinguished this species from O. **americanus** above. The right paramere of **americanus** has a blunt tooth on the outer margin as compared with the flattened lobe on the outer margin of the right paramere of O. **banksi**.

Genital armature: The right paramere bears a semi-heart-shaped lobe on the outer margin. (Fig. 12).

Distributional notes: The Francis Huntington Snow collection has representatives from White Plains, New York; Westfield, New Jersey; Vienna, Virginia; Capron, Florida.

Ochterus manni Hungerford

Hungerford, 1927, Proc. Ent. Soc. Wash., Vol. 29, p. 189.

"Size.—length, 4.1 mm. Width across head, 1.2 mm. Greatest width, 2 mm.

"Color.—Color markings not strikingly distinct. The pattern composed of the usual mottling of bluish-grey on black. Lateral and rear margin of pronotum and lateral margin of hemelytra, yellowish.

"Structural characteristics.—Anterior tibia of male curved. Antennal formula is as follows: 2d:3d:4th::5:9:9. Distal end of third antennal segment reaching the lateral margin of the pronotum.

"Comparative notes.—this species does not have a distinctive color as does **Ochterus brunneus**. It is much smaller and not marked with brown as in **Ochterus americanus** Uhler. It is about the size of some males of **Ochterus banksi** Barber, but the anterior lateral margins of pronotum are less expanded and the third and fourth segments of antennae are longer and more slender. It can not be any described species because it fails to agree in size, shape or color pattern with the species described in Central and South America."

Comparative notes: This species is closely related to **hungerfordi**, but the right paramere is a single, sickle-shaped structure, while that of **hungerfordi** has a large flattened flange on the outer margin.

Genital armature: The paramere is simple, sickle-shaped. (Fig. 13).

Distributional notes: Type described from a single male bearing the label, Huachi Rio Beni, Boliv. W. M. Mann. Sept. Mulford Biol. Expl. 1921-22. The type is in the Francis Huntington Snow collection to be sent to the United States National Museum. The Snow collection also contains specimens from Costa Rica and Peru.

Ochterus victor (Bolivar)

Bolivar, 1879, An. Soc. Espan. Hist. Nat., VIII, p. 144.

Translation of original description follows:

"♂—Black, violet tinge; head with margin and transverse posterior lines, roundish spots above the eyes, and corium with external and posterior margin, yellow; dorsal membrane concolorous, margin becoming paler; rostrum and legs yellow to ferruginous; abdomen fuscous to ferruginous, pubescent, disc black; corium with indistinct yellow punctures head slightly rugulose, without carina;

"Length, body, 0m,007; width, 0m,0045.

"Country.—Pichincha, Ecuador. (Martinez y Saez).

Observation.—It is the first Pelogonus found in America."

I was unable to secure any specimens of this species for study. Therefore, it is not included in the key.

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SOME NOTES ON THE BIOLOGY OF THE PACK RAT CUTEREBRID (CUTEREBRID BEAMERI HALL) IN KANSAS.

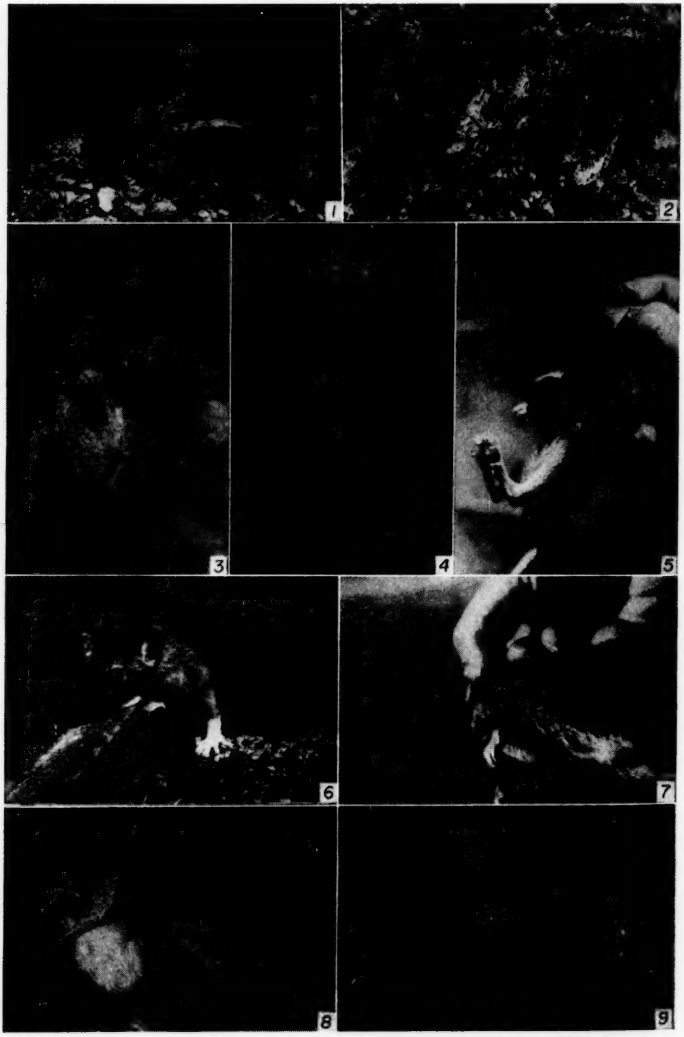
BEAMER, R. H., PENNER, L. R. and HIBBARD, C. W.

For the past several years C. W. Hibbard had noticed infestations of the pack rat, **Neotoma floridana osagensis** Blair, by large cuterebrid larvae in Greenwood County, Kansas. He had also tried to rear out adults but was not successful until the summer of 1941 when he brought in one young rat with five larvae and succeeded in having three adult flies emerge September 4, 1941. These were reported back as new by David G. Hall of the United States National Museum, with the request that more specimens be obtained if at all possible.

About the middle of May, 1942, Beamer and Hibbard examined twelve litters of pack rats at the type locality but no cuterebrid parasitism was evident. On June 19, 1942, Beamer and Penner visited the same locality and spent the next two days examining 45 pack rat nests from which they collected 26 rats. The second nest examined had one female with three young attached, all four having cuterebrid larvae and one of the young with two. All of the rats were taken to Lawrence, June 22nd, and placed in cages, usually not more than four to a cage. There was some mortality among the rats and in this way the old mother and her larvae were lost. Her young were, however, able to survive without her and all matured their warbles.

On July 2nd the first larva emerged while we were making photographs and all the larvae in this litter had emerged by July 8th. It was on this date that we discovered another fairly large rat was developing a larva. It had been missed until this time and emerged July 19th. August 19th we sifted the dirt in the rat cages and recovered five puparia. All of the larvae had emerged and pupated.

Two adult flies emerged August 23rd, a male and a female. The male did not seem to be normal and failed to fertilize the female. It died on August 26th and the female on August 27th, after laying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about 285 eggs. The female placed most of these eggs on the outside of the screen of the cage by placing the tip of the ovipositor between the meshes of the screen.

A second female emerged September 5th, began laying eggs on September 10th and died September 12th. She, like the other female, laid about 285 eggs and placed them on the outside of the wire of the cage.

The eggs are almost white, about one millimeter long, flat on one side, with the ends oval and an oval operculum on top at one end with the cap fitting well down in the opening. No small larvae have been seen. The mature, emerging larvae are slightly more than an inch in length and almost half that in thickness. They are dark brown in color and very slow in movement, although they will bury themselves in the soil in a very few minutes. As nearly as we could observe the rats paid no attention to the larvae. All larvae observed have been located beneath the skin between the front legs of the rat.

The senior author, trying to find an answer as to where this cuterebrid lays its eggs in nature, visited the type locality on September 18 1942 Thirty pack rat nests were examined in two of which cuterebrid eggs were found. One nest was under a flat stone and the first eggs were noticed on a stick in the entrance. Others were found on the underside of the flat rock. About 35 eggs were counted here. The other nest was under a large cottonwood log with the cuterebrid eggs scattered at random on the bark immediately over the entrance to the burrow. (Fig. 2.) About the same number of eggs were counted here as in the other nest. All of these eggs had either hatched or were infertile when found. These observations would tend to point to a random placing of the eggs on sticks or stones in or over the entrance to the nests of the pack rats.

The fact that adult flies emerged in September on two successive years led the authors to think there should be two generations of these flies a year. Accordingly, on September 20th near Lawrence we examined five litters of pack rats, young still attached to their

EXPLANATION OF PLATE

Fig. 1. Typical nest of pack rat under a flat rock.

Fig. 2. Eggs of **Cuterebro beameri** Hall on cottonwood bark removed from just above entrance of pack rat nest.

Fig. 3. Young pack rat with two larvae of **Cuterebra beameri** Hall just before emerging.

Fig. 4. Puparium of **Cuterebra beameri** Hall.

Fig. 5. Young pack rat with larva almost out.

Fig. 6. Same rat with larva just out.

Fig. 7. The wound just after larva emerged.

Fig. 8. View of the same rat as in Fig. 3 five days after emergence of larvae.

Fig. 9. The larva of **Cuterebra beameri** Hall ready to go into the soil..

mothers, but no cuterebrids were found. Not yet convinced, Beamer, Hibbard, Leonard, and Jack Beamer visited the type locality on September 27th. Fifty rat nests were examined from which forty-five rats were taken, five of which had six cuterebrid larvae. Many of these, including the infested ones, were brought back to Lawrence and caged. The first larvae emerged on October 10th and the last came out on October 14th. At this writing, March 15, 1943, none of the adult flies had appeared.

The cleanliness of the wounds and of the area about the wounds in the pack rats caused by these huge larvae was remarkable. The warbles never seemed to bother the rats at any time. The only evidence one had that the rats were aware of their parasites was infrequent scratchings of the area with the hind feet. Immediately after a larva had emerged there was quite a large, sometimes bloody, hole in evidence but the rapidity with which these holes closed and completely healed was astonishing. Usually within four or five days practically all signs of the rather terrible wound had disappeared.

SUMMARY

1. There is a species of Cuterebridae (**Cuterebra beameri** Hall)[1] infesting pack rats (**Neotoma floridana osagensis** Blair) in Kansas.

2. From one to five larvae have been found in one rat.

3. This cuterebrid lays its eggs at random in and over the entrance to the rat nests.

4. The rapidity with which the wounds, caused by the larvae in the rats, heal is remarkable.

5. There are two generations of this fly a year.

1. Proc. Ent. Soc. of Washington, Vol. 45, No. 1, Jan. 1943, p. 25.

STUDIES IN PHYLLOMYDAS (MYDAIDAE-DIPTERA)

D. ELMO HARDY, Lawrence, Kansas*

The Mydaidae belonging in the genus Phyllomydas, as characterized by this writer, have no developed palpi; the spur of each hind tibia is straight and shorter than the apical spines and equal or less than the width of the basitarsus. The antennae of the sexes are dissimilar, in the male the apical portion is much more elongate and flattened than in the female; the mesonotum with hairs on posterior margin; the females have no circlet of spines at the apex of abdomen; the front is broad and flat and the vertex is only slightly concave, only sunken below eye margin behind ocelli.

*Contribution from Department of Entomology, University of Kansas.

Key to Species Based upon Males

1. Entirely dark colored species, chiefly metallic black or brownish ..... **Phyllocerus Bigot**
   Abdomen at least with yellow to rufous bands on apices of segments 2
2. Abdomen entirely light colored 3
   Only apices of segments yellow, otherwise dark reddish brown; wings hyaline except along costal margin ..... **scitulus** (Williston)
3. Thorax and legs entirely black, pile of head and thorax black ..... **currani** n. sp.
   Legs, scutellum, metanotum, pleurae and sides of mesonotum yellow-brown, pile of head and thorax yellow ..... **bruesii** Johnson

Phyllomydas bruesii Johnson

Phyllomydas bruesii Johnson, 1926, Proc. Bost. Soc. Nat. Hist., 38, 140.

This species is related to **P. phyllocerus** Bigot and they are rather similar structurally, however the genital characters are very distinctive. The clasping structures are very blunt, evenly rounding on the sides and the cleft of coxopodite is broadly 'v' shaped. The antennae are slightly different in shape in the two species and the yellow-red abdomen and legs and yellow pile of **P bruesii** will distinguish it.

Length 17 mm.

The females of **P. bruesii Johnson** and **P. phyllocerus** Bigot are difficult to distinguish unless accompanied by males.

Type locality: Galveston, Texas. Type in Cambridge Museum of Comparative Zoology.

Topotypic specimens are in the Snow Collection, May (F. H. Snow) also specimens from Arkansas Co., Texas, 8-6-28 (R. H. Beamer, L. D. Beamer and A. M. James) and Cameron Co., Texas, 8-3-28 (R. H. Beamer, A. M. James).

Phyllomydas currani n. sp.

This species is related to **P. bruesii** Johnson and is distinguished by having the thorax and legs entirely black, pile of head and thorax black, wings dark brown fumose and fourth antennal segment about equal to length of first three.

Male.—Head: Entirely black, covered with dense black pile. Face strongly gibbose and thickly haired. Front broad and rather flat with transverse ridge extending across the upper portion in line with upper ocelli. Vertex gently concave, sloped gradually from the eye height. Fourth antennal segment densely brown pollinose, slightly enlarged at base and tapering toward apex, this segment

has a distinct transverse depressed area at its middle; segments one to three about equal in length to fourth. **Thorax:** Subshining black in ground color, the dorsum is finely rugulose, giving it a subopaque, faintly grayish appearance. Pile of dorsum rather sparse, more dense on anterior lateral margins. Mesopleurae with numerous hairs on posterior and anterior margins. Legs: entirely black. Posterior trochanters with only fine hairs below. Hind femora thickened toward apical portion, femoral spines strong. Posterior tibia straight or nearly so, apical spur well developed but shorter than the terminal bristles. Tarsal subsegments rather thick, first one and one-fourth longer than second. Halteres black. Squamae with a dense fringe of long black pile. **Wings:** Rather dark brown fumose, apex and the median portion of cells R_5 and R_3 almost hyaline. **Abdomen:** Dorsum entirely yellow red, except for brownish black genital portion. Venter chiefly yellow, margins of segments faintly brownish.

Length: body (not including antennae) 17 mm.; wings 12 mm.

Holotype male, Douglas, Arizona (W. W. Jones).

Length: body (not including antennae) 17 mm. Wings 12 mm.

Holotype male, Douglas, Arizona (W. W. Jones).

Female unknown.

Type returned to Dr. C. H. Curran, American Museum of Natural History.

Phyllomydas phyllocerus Bigot

Phyllomydas phyllocerus Bigot, 1880, Bull. Soc. Ento. France.

As stated above this species is related to **P. bruesii** Johnson, the metallic black body and legs, black pile and distinctive genitalia readily separate it.. The clasping structures are rather acutely pointed on inner apices and the cleft on the posterior median margin of the coxopodite is 'U' shaped.

Length 18-20 mm.

Females are difficult to distinguish from **P. Bruesii** unless accompanied by males.

Type locality, Rocky Mountains.

This species is rather common and widely distributed over the central states and west.

Phyllomydas scitulus (Williston)

Mydas scitulus Williston, 1886, Trans. Amer. Ent. Soc., XIII; 291.

This species is distinguished by the broad bands of yellow on apices of the abdominal segments and by the chiefly hyaline wings, with only the costal margin brownish.

Length: 14-15 mm.

Type male, Arizona. In Snow Collection.

A NOTE ON THE RANGE OF MESOVELIA CRYPTOPHILA HUNGERFORD (HEMIPTERA: MESOVELIIDAE)

HALBERT M. HARRIS, Ames, Iowa

In 1924 Doctor H. B. Hungerford described **Mesovelia cryptophila**, the second of two new species of Mesoveliidae that he had found frequenting a particular bog habitat in the vicinity of Douglas Lake, Michigan (Ann. Ent. Soc. Amer., 17; 453-455, 1926). Some eight years later, Clarence E. Hoffman reviewed the biology of the species found at Douglas Lake, and considered that the known distribution of **cryptophila** was limited to that one bog (Can. Ent. 64:113-120, 1932). Previous to Hoffman's work, however, the writer had found a few specimens of this species in some miscellaneous aquatic material taken at Wapello, Iowa, in 1926, and at McComb, Mississippi in 1924, and its occurrence at these localities had been recorded in a joint paper with Dr. Carl Drake on the general distribution of some North American water striders (Ohio Journal Sci., 28:274, 1928). Sixteen years passed during which much miscellaneous collecting was done both in Iowa and Mississippi without the discovery of another specimen. It was with considerable resolve, therefore, that I set out this past summer to find this form when occasion to collect in eastern Iowa presented itself.

As luck had it, I was not forced to seek out the site of my original collecting at Wapello, for on my first try, August 11, I found the species on the stagnant backwater of a stream about five miles south of the city of Clinton. Specimens were rare there in comparison to the numbers of individuals of **M. mulsanti** White one took in the net. Much work was necessary to get a dozen individuals and I seemed to get them only in shady spots around the base of a few small trees standing in the water. Each dredging with the net brought in scores of **M. mulsanti, Microvelia borealis** T. B., **Rheumatobates rileyi** Bergr., **Hydrometra martini** Kirk., and other aquatic forms and the small size, the dark color, and the alacrity of their movement, particularly of the slender male individuals, made it difficult to capture **M. crytophila.**

On September 10 while collecting around a small pond near Bedford in southwestern Iowa, I was greatly surprised, and pleasantly so, to find **M. crytophila** again. I had been at the pond a good hour and had collected almost completely around its borders without a thought of **M. cryptophila** when the urge came to me to try my net along some logs floating out from the bank. As I retrieved my net I was amazed to see the characteristic **M. cryptophila** dashing for

the rim. Collecting along the shady side of the log and in the shady angles between adjacent logs soon yielded a nice series of individuals, this time in company with **M. mulsanti** White, **Hydrometra martini** Kirkaldy, and **Microvelia hinei** Drake. Thus it appears that **Mesovelia crytophila** Hungerford has a fairly wide range, and that greater attention to secluded and shady spots with more careful observation of the minute and agile forms that hurriedly scamper from the net may yield it elsewhere. All individuals taken were apterous.

NOTES AND DESCRIPTIONS OF SOME SPECIES OF DIKRANEURA (HOMOPTERA AIADELBDAE)

R. H. BEAMER, Lawrence, Kansas

This paper is a result of working up the undetermined Dikraneura in the Snow Entomological Collection, University of Kansas. Four old species are included and twelve described as new. A majority of the new ones have been considered **D. kunzei** in the past. Thanks are due Colorado State College for the loan of types of **D. kunzei** and **D. rufula** and to P. W. Oman of the United States National Museum for the comparison of material with the type of **D. lenta** McA.

All types of new species are in the Snow Entomological Collection, University of Kansas, Lawrence, Kansas.

1. **Dikraneura rufula** Gill.

Dikraneura abnormis var. rufula, Gillette, C. P., Proc. U. S. Nat. Museum XX. p. 720, 1898.

Genitalia: Male aedeagus in lateral view bent dorsally at almost right angles near base; ventral margin with sharp shoulder near outer third ending in a sharp point which protrudes toward apex of ventrally curving bifid process which arises from apex of dorsal margin. A pair of curved processes near middle of shaft on dorsal margin with a shorter retrorse sharp spine just anterior to these and on same margin.

Since the female type was supposed to be in the U. S. National Museum and is apparently lost, two specimens without abdomens from the Colorado State collection were studied. One of them from Placer Co., California, is probably the mutiliated specimen referred to in the original description, and since the specimen described and figured here agrees with it in shape of head and coloring, this ♂ from Dunsmuir, California, June 29, 1935, R. H. Beamer, is here designated **neotype**.

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*Contribution from Department of Entomology, University of Kansas.

2. Dikraneura ungulata Beamer, n. sp.

Resembling D. rufula Gill. but much larger (3.5 mm. to 4.5) with ventral apical process of aedeagus very long and slender and lateral processes near base of shaft at about its middle in lateral view.

Length ♂ 4.5 mm.

Vertex quite sharp, margins arcuate; pronotum almost as long as wide; elytra long.

Color: Greenish yellow to semihyaline, one specimen with a reddish tinge.

Genitalia: Male plates about three times as long as width at base, roundingly tapered on outer half to sharp apices. Pygofer long, narrowed on outer half into a long, sharp, dorsally projecting spine. Aedeagus in lateral view bent at right angles near base, widest just beyond bend with a pair of curved lateral processes near middle of this wide region, shaft almost parallel to outer fourth where it divides into a single, long, slender, ventral process and a longer dorsal one which is divided about half its length and curves ventrally around the apex of the single one.

Holotype ♂ Santa Rita Mts., Arizona, Aug. 18, 1935, E. I. Beamer. Allotype ♀ and ♀ paratype same time and place. R. H. Beamer.

3. Dikraneura retusa Beamer, n. sp.

Resembling D. rufula Gill., but vertex quite distinctly blunted and aedeagus with pair of curved processes on ventral margin of shaft near apical offset and just a coarse bump on dorsal margin near middle.

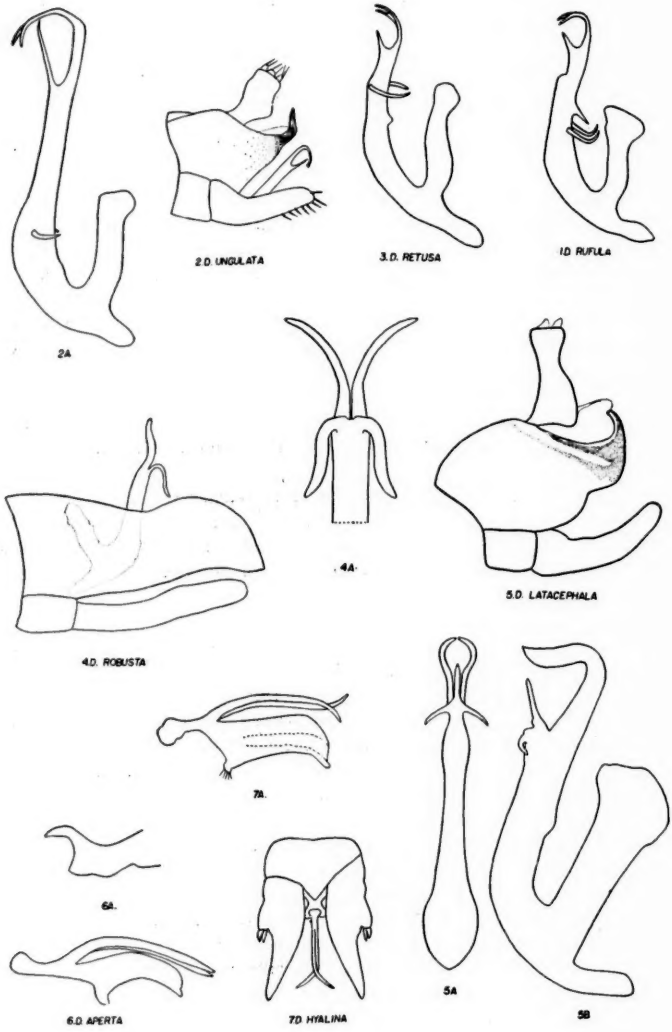
Length ♂ 3.5 mm.

Vertex distinctly blunter than average specimen of D. rufula, forming almost a right angle.

Color: Reddish except eyes, a thin longitudinal line on vertex, anterior margin of pronotum and scutellum yellowish, cells in elytra semihyaline, and costal plaque whitish. The females do not seem to be quite so heavily marked with red as do the males. Yellowish green seems to take the place of red.

Genitalia: Plates slightly more than twice as long as basal width, tapering almost from base to apex, about one-fourth as wide as base, rounded. Pygofer narrowed on outer half into a long dorsally curving spine. Aedeagus in lateral view bent at about right angles near base, pair of processes curving dorsally on ventral margin near the outer third, shaft narrowing from here to end in a sharp spine projecting toward apex of a bifurcate process coming off the dorsal margin, this margin with a blunt tooth near the middle.

Holotype ♂; allotype ♀; and one ♂ and nine ♀ paratypes, Stinson Beach, Calif., Aug. 15, 1938, R. H. Beamer. Other paratypes: 22 ♂s and 25 ♀s, Monterey, Calif., July 22, 1935, R. H. Beamer; 3 ♂s


2A.
2D. UNGULATA
3D. RETUSA
1D. RUFULA
4A.
4D. ROBUSTA
5D. LATACEPHALA
7A.
6A.
6D. APERTA
7D. HYALINA
5A
5B

Mt. Tamalpais, Calif., August 15, 1938, R. H. Beamer.

4. **Dikraneura robusta** Lawson

D. robusta Lawson, P. B., Canadian Ent., 1930, February, Vol. LXII.

Genitalia: Last ventral segment of female twice as long as preceding; lateral angles broadly rounded; posterior margin shallowly excavated on median third. Male valve broader than base of plates apically rounded. Plates long and narrow; laterally flattened on outer third, fitting the sides of apex of pygofer; pygofer exceptionally long, outwardly avicephaliform, ventral outer margin pointed out, protruding between and below the apex of the plates. Aedeagus in lateral view with shaft bent dorsally. Apex with a pair of retrorse processes slightly longer than width of shaft, arising on ventral margin; another pair of longer processes arising on dorsal margin projecting up and out.

Allotype ♀ and numerous ♀ parallotypes, Chama, N. Mex., July 5, 1937, C. L. Johnston.

5. **Dikraneura latacephala** Beamer, n. sp.

Resembling **D. robusta** Lawson but pygofer truncate at tip and aedeagus in lateral view with 5 processes at apex instead of 4.

Length 3 mm.

Head wider than pronotum; general color milky white, tinged with ivory on the vertex.

Genitalia: Last ventral segment of the female about two and one-half times as long as preceding, lateral angles broadly rounded, posterior margin slightly produced at middle third. Male pygofer more or less truncate at the apex, dorsal outer corner produced into a broad curving process. Aedeagus in dorso-ventral view swollen at the base narrowing to a small enlargement just before apex, with 5 apical processes; in lateral view more or less U-shaped, slightly more than 6 times as broad as long, dorsal margin ending in a pair of broad recurved processes; ventral margin ending in a sharp slender spine with a pair of slender retrorse processes at its base.

Holotype ♂, allotype ♀ and 13 female paratypes, Creede, Colo-

PLATE I.

Fig. 1. Lateral view of aedeagus **Dikraneura rufula** Gill.
Fig. 2. Lateral view of tip of abdomen of ♂ **Dikraneura ungulata** n. sp.
2a. Lateral view of aedeagus.
Fig. 3. Lateral view of aedeagus **Dikraneura retusa** n. sp.
Fig. 4. Lateral view of tip of abdomen **Dikraneura robusta** Lawson.
4a. Ventral view of tip of aedeagus.
Fig. 5. Lateral view of tip of abdomen of ♂ **Dikraneura latacephala** n. sp.
5a. Ventral view of aedeagus.
5b. Lateral view of aedeagus.
Fig. 6. Lateral view of aedeagus of **Dikraneura aperta** n. sp.
6a. Apex of style.
Fig. 7. Ventral view of apex of abdomen of **Dikraneura hyalina** n. sp.
7a. Lateral view of aedeagus.

rado, July 6, 1937, 3♂ and 13 ♀ paratypes, Pagosa Springs, Colorado, July 5, 1937, R. H. Beamer.

6. **Dikraneura aperta** Beamer, n. sp.

Resembling **D. rubens** Beamer in internal genitalia, but without bright orange-red markings of dorsum, and processes of aedeagus not crossing at their base.

Length 3 mm.

Color: Stramineous to semihyaline. Vertex with a semblance of two darker comma spots on disc. Pronotum with an indication of a pair of golden yellow diverging spots near middle in some specimens. Elytra semihyaline, usually tinged with yellow in form of oblique vittae with a small dark spot at tip of clavus. Areas about crossveins more or less fumose.

Genitalia: Last ventral segment of female about twice that of preceding, lateral angles broadly rounded, posterior margin almost straight. Valve of male triangular; plates as broad at base as valve, suddenly narrowed on outer margin near middle with strong spine on this shoulder, outer third not more than half as wide as base. Aedeagus in lateral view with shaft about twice as long as basal width, apex slightly hooked dorsally with pair of long slender processes arising ventrally at base of shaft, reaching slightly beyond apex.

Holotype ♂, allotype ♂; 2 ♂ and 6 ♀ paratypes, Stinson Beach, Calif., August 15, 1938, R. H. Beamer.

7. **Dikraneura hyaline** Beamer, n. sp.

Resembling **D. readionis** Lawson but vertex, pronotum and scutellum golden yellow instead of stramineous; shaft of aedeagus in lateral view broad, about three times as long as wide, and almost as long as two ventral processes.

Length 3.5 mm.

Color: Semihyaline tinged with golden yellow, with a small fuscous spot on apex of clavus and some darker areas in region of cross veins.

Genitalia: Last ventral segment of female about twice as long as preceding, posterior margin roundingly produced. Male plates broad on basal half, abruptly narrowed on outer margin forming a shoulder with two blunt teeth. Aedeagus in lateral view broad, about three times as long as wide, apex slightly curved dorsally; ventral margin with a pair of narrow processes arising at base, extending parallel with shaft, crossing each other near tip, and ending slightly beyond apex of shaft.

Holotype ♂, allotype ♀, and 4 ♂ paratypes, Siskiyou National Forest, Calif., July 14, 1935; R. H. Beamer.

8. **Dikraneura kunzei** Gill.

Dikraneura kunzei Gillette, C. P., Proc. U. S. National Museum, XX, p. 721, 1898.

Male plates scarcely three times as long as width at base, rapidly narrowed on outer half to about one third basal width, apex rounded. Pygofer with a heavy brown spine on dorsal outer corner. Aedeagus broad in lateral view, bent at right angles dorsally near base; in dorsoventral view almost one-third as wide as long, gradually tapering to slender tip. In cross-section shaft is V-shaped with opening of V posterodorsal, this opening occupied by a slender process, usually exposed on about apical third and ending short of apex of shaft.

Two ♂ and one ♀ cotypes examined through the courtesy of Doctor James, Colorado State College, Ft. Collins, Colorado. The male with No. 2089 is here designated Lectotype. Taken by R. E. Kunze, Tuscon, Arizona, April 11-14, 1896, sweeping weeds, grass, alfalfa, etc.

This species is commonly collected on mesquite and related plants.

9. **Dikraneura lenta** McA.

Dikraneura kunzei var. **lenta** McAtee, W. L.,, Jour. N. Y. Ent. Soc. p. 160, 1926.

Resembling **kunzei** but with usually blunter head and process of aedeagus as long as or longer than shaft.

Genitalia: Aedeagus longer than in **kunzei** and narrower in both lateral and dorsal view, with one median process as long as or longer than shaft.

A specimen studied from Alpine, Texas, compared with type in U. S. National Museum by P. W. Oman.

This species has the same general type of aedeagus as **D. kunzei** but with the differences as stated. Twenty-three males were dissected and studied.

10. **Dikraneura benedicti** Beamer, n. sp.

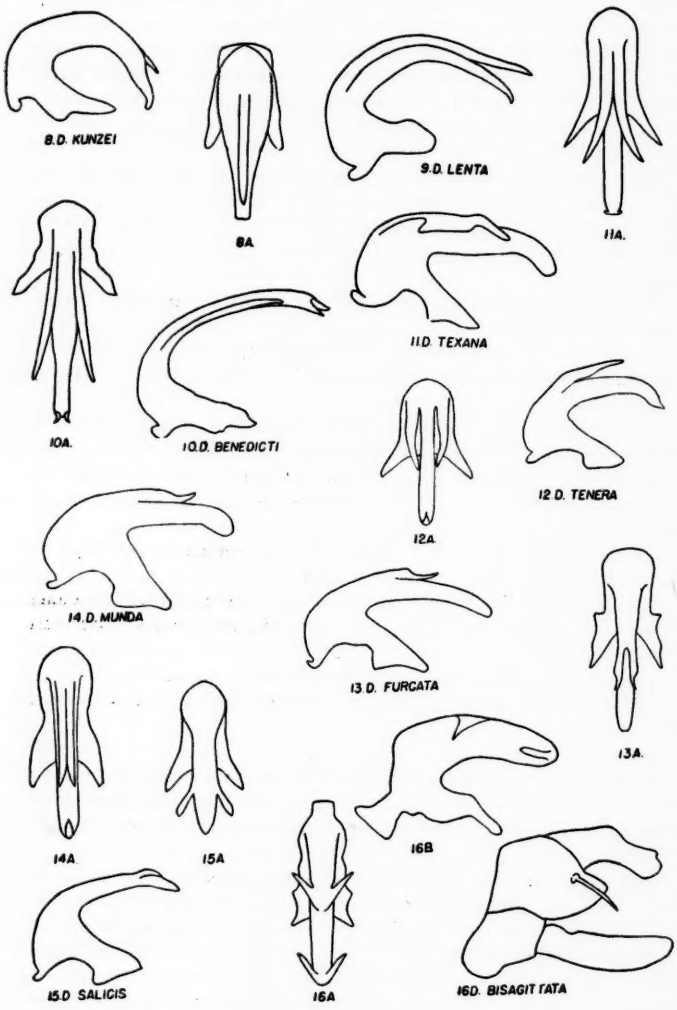
Resembling **D. kunzei** Gill., but aedeagus cylindrical with processes on side.

Length 2.75 mm.

Color: Vertex, anterior margin of pronotum and scutellum ivory with golden yellow flecks, basal angles of scutellum and apex solid golden yellow; disc of pronotum more semihyaline. Elytra greenish semihyaline.

Genitalia: Plates of male about three times as long as basal width, outer margin roundingly narrowed near middle to about half basal width, apex rounded. Pygofer with a short tooth on outer dorsal corner. Aedeagus long and slender in lateral view, sickle-shaped, widest at base, almost parallel-sided on outer three-fourths, with a pair of lateral processes diverging laterally from shaft on outer third.

Holotype ♂ and 8 ♂ paratypes, Jeff Davis Co., Texas, July 8, 1933, W. Benedict.


8.D. KUNZEI
8A.
9.D. LENTA
11A.
10A.
10.D. BENEDICTI
11.D. TEXANA
12A.
12 D. TENERA
14.D. MUNDA
13 D. FURCATA
13A.
14A.
15A
16B
15.D SALICIS
16A
16D. BISAGITTATA

11. **Dikraneura texana** Beamer, n. sp.

Resembling **D. benedicti**, but with aedeagus in lateral view with a dorsally bent tip and processes on dorsal margin of shaft with apices bent dorsally on outer third.

Length ♂ 3 mm.

Color: Vertex, pronotum and scutellum ivory, often flecked with golden yellow or orange. Disc of pronotum more or less semihyaline. Elytra greenish semihyaline tinged with yellow.

Genitalia: Plates of male about three times as long as basal width, slightly wider just out from base, then roundingly narrowed to about half basal width, apices rounded. Pygofer about as in **D. benedicti**; hook on outer dorsal corner slightly larger. Aedeagus in lateral view bent dorsally at right angles near base and again near tip; about twice as wide at first bend as at second, with pair of dorsal processes diverging and bending dorsally on outer third, ending near outer fourth of shaft.

Holotype ♂, allotype ♀, and three ♂ paratypes; Ft. Stockton, Texas, July 1, 1936, R. H. Beamer.

Other paratypes: 1 ♂ and 1 ♀, Davis Mts., Texas, July 12, 1938, R. H. Beamer. Two ♂s, Jeff Davis Co., Texas, July 8, 1933, W. Benedict; 3 ♂s, Valentine, Texas, July 13, 1938, R. H. Beamer.

12. **Dikraneura tenera** Beamer, n. sp.

Resembling **D. texana** but aedeagus, with lateral processes apparently at sides of shaft and tip of shaft in lateral view, sharp rather than rounded.

Color: Vertex, anterior margin of pronotum and scutellum ivory, mottled with golden yellow; remainder of pronotum and elytra yellowish green, more or less pruinose.

PLATE II.

Fig. 8. Lateral view of aedeagus of **Dikraneura kunzei** Gill
8a. Ventral view of aedaegus.
Fig. 9. Lateral view of aedeagus of **Dikraneura lenta** McA.
Fig. 10. Lateral view of aedaegus of **Dikraneura benedicti** n. sp.
10a. Ventral view of aedaegus.
Fig. 11. Lateral view of aedaegus of **Dikraneura texana** n. sp.
11a. Ventral view of aedeagus.
Fig. 12. Lateral view of aedeagus of **Dikraneura tenera** n. sp.
12a. Ventral view of aedeagus.
Fig. 13. Lateral view of aedaegus of **Dikraneura furcata** n. sp.
13a. Ventral view of aedeagus.
Fig. 14. Lateral view of aedeagus of **Dikraneura munda** n. sp.
14a. Ventral view of aedeagus.
Fig. 15. Lateral view of aedeagus of **Dikraneura salicis** n. sp.
15a. Ventral view of aedeagus.
Fig. 16. Lateral view of tip of abdomen of ♂ **Dikraneura bisagittata** n. sp.
16a. Ventral view of aedeagus.
16b. Lateral view of aedeagus.

Genitalia: Male plates and pygofer about as in **kunzei**, aedeagus in dorsoventral view with shaft narrow, almost parallel-sided to rounded apex, with a pair of lateral processes slightly more than half as long as shaft; in lateral view shaft bent dorsally near base, narrowing gradually to another dorsal bend near sharp apex; processes in this view stand away from shaft with sharp apices.

Holotype ♂, allotype ♀, 4 ♂ and 4 ♀ paratypes. Arivaca, Arizona, July 26, 1941, R. H. Beamer.

13. **Dikraneura furcata** Beamer, n. sp.

Resembling **D. texana**, but processes of aedeagus apparently joined together on basal two thirds, then bifurcate on apical third.

Length ♂ 2.25 mm.

Color: More nearly golden yellow than other species of this group with lighter flecks on vertex, pronotum and scutellum. Elytra semihyaline washed with yellowish green.

Genitalia: Male plates about three times as long as basal width, slightly enlarged just out from base, roundingly narrowed to half basal width on outer third, tip rounded, pygofer with rather heavy hook on dorsal outer corner. Aedeagus in lateral view bent dorsally at right angles near base, gently curving dorsally to tip; in dorsal view processes apparently united on basal two thirds, each process excavated near apex on outer margin.

Holotype ♂, allotype ♀, 4 ♂ and 5 ♀ paratypes; Three Rivers, Texas, June 27, 1938, R. H. Beamer. Other paratypes: 1 ♂ and 2 ♀, Brownsville, Texas, June 26, 1938; 1 ♂ College Station, Texas, June 23, 1938; 1 ♂, Concan, Texas, July 6, 1936.

14. **Dikraneura munda** Beamer, n. sp.

Resembling **tenera** but coloring of vertex, anterior margin of pronotum and scutellum solid yellow, not mottled; processes of aedeagus on ventral side of shaft and tip of shaft in lateral view rounded.

Length: 3 mm.

Vertex slightly less than right angle from eye to eye; length at middle about equal to width between eyes.

Color: Face, vertex, anterior margin of pronotum and scutellum golden yellow, segments of abdomen dark except last ventral and pygofers of female which are light. Elytra semihyaline, washed with yellowish green more or less pruinose.

Genitalia: Last ventral segment of female several times as long as preceding; posterior margin with lateral angles broadly rounded and median fourth roundingly produced. Aedeagus in dorsoventral view with shaft of medium width, sides almost parallel to rounded apex with pair of processes on ventral side, slightly diverging at tips, extending about two-thirds distance to tip of shaft; in lateral view shaft bent dorsally at base and again near apex, processes close

to shaft except diverging from it at their apices.

Holotype ♂, allotype ♀, 4 ♂ and 11 ♀ paratypes; Indio, Calif., December 22, 1941, R. H. Beamer.

Swept from mesquite.

15. **Dikraneura salicis** Beamer, n. sp.

Resembling **D. kunzei** but aedeagus with two short lateral processes near apex of shaft.

Length 2.25 mm.

Color: Vertex, scutellum and anterior margin of pronotum ivory with orange marks; remainder semihyaline, tinged with yellowish green.. Vertex with orange line either side of margin connected before apex, crown with five or six more or less parallel ivory longitudinal lines, remainder orange. Narrow anterior margin of pronotum with a semblance of nine ivory longitudinal lines. Scutellum with basal angles, circle at apex and two median parallel lines orange.

Genitalia: Last ventral segment of female about three times as long as preceding, lateral angles broadly rounded, posterior margin produced throughout, more pronounced at middle. Aedeagus of male in dorso ventral view broad about as wide near base of processes as one fourth length of shaft, with pair of lateral processes arising about width of shaft from its apex, rather broad and heavy.

Holotype ♂, allotype ♀, 2 ♂ and 8 ♀ paratypes; Ruby, Ariz,. July 22, 1938, R. H. Beamer. Swept from **Salix taxifolia** H. B. K.

16. **Dikraneura bisagittata** Beamer, n. sp.

Resembling **D. kunzei** Gill., but entirely golden yellow, and aedeagus with two pairs of sagittal processes.

Length: 2.5 mm.

Color: Golden yellow with head, pronotum and scutellum usually darker.

Genitalia. Last ventral segment of female more than twice as long as preceding, lateral margins with outer angle broadly rounded, posterior margin definitely produced medianly, broadly excavated either side of middle. Pygofer with a long slender spine arising on dorsal margin near base of anal tube, about half as long as width of pygofer. Aedeagus broad in lateral view, at middle about one third as wide as length; shaft with two pairs of short processes, one pair at apex about middle of side, and one pair on ventral margin near middle of shaft, all processes slightly longer than width of shaft in dorsoventral view.

Holotype ♂, allotype ♀, 14 ♂ and 56 ♀ paratypes; Estero, Fla., July 21, 1934, R. H. Beamer. Numerous paratypes from Bonita Springs, Florida, July 21, 1930; R. H. Beamer; and Likely; Fla.; August 7, 1930 and July 24, 1934, R. H. Beamer.

A CONTRIBUTION TO THE TAXONOMY OF THE GENUS ORGERIUS IN AMERICA, NORTH OF MEXICO (FULGORIDAE, HOMOPTERA)

KATHLEEN C. DOERING and HERBERT H. DARBY, Lawrence, Kansas*

Abstract

This paper involves a comprehensive study of the genus Orgerius in America, North of Mexico. To the two older species, **O. rhyparus** Stal 1859 and **O. minor** Ball 1909, have been added the following nine new species: **proprius, triquestrus, bucculentus, bilobatus, junceus, spicatus, disgregus, bicornis,** and **foliatus.** Three of the varietal forms of Ball and Hartzell (1922) have been raised to specific rank; namely, **pajaronius, concordus** and **ventosus. Orgerius rhyparus** var. **clitellus** (Ball and Hartzell, 1922) is not recognized even as a color variety since this same coloring is occasionally found in four other species. Dissections of the male genitalia were made and the structures figured. Other comparative structural drawings are included. The structures of most value in the classification of the group are lateral lobes of the ninth abdominal segment in the male, length and shape of the vertex and the male genitalia.

DESCRIPTION OF SUBFAMILY DICTYOPHORINAE

Head narrower than the mesonotum. Vertex produced in front of the eyes a definite fractional part of its length depending on the species, apex truncate or slightly conical. Frons with median carina and apex without ocelli, border of face always sharp or with a keel. Lateral margins of pronotum equalling its median length. Wings macropterous, many brachyterous, no transverse veins along costal border or no distinct cross veins from costal margin to apex of clavus. Anterior femora normal. Posterior tibia without a movable spur.

DESCRIPTION OF THE TRIBE ORGERIINI

The ocelli are completely absent, the face has lamellate, carreened borders. its length is greater than the basic width, and a distinct carina passes through its middle. The upper wings are very short. Clavus and corium are not distinguishable. As viewed from the side the pronotum shows two well pronounced, closely adjacent carinae; the upper one of which serves as a border of the dorsal surface, but the lower one is not far below it, after which the pronotum is reflexed into a broad ventral flap. Tegulae not noticeable. The upper wings short and not reaching one-half of the abdomen. They cover the upper side of the body, but turn vertically down on the sides near the base forming a fairly broad and smooth flap, tapering toward the middle of wing. A distinct longitudinal

*Contribution from Department of Entomology, University of Kansas.

mesal carina runs lengthwise of the dorsal surface of the abdomen and lateral of this on the sides of the abdomen not far from the border a more indistinct carina is usually seen. On the side of each abdominal segment not covered by the tegmina just back of middle is a transverse row of pits. Body always bare, only the trunk, the feet and one-half of the appendages are covered with fine hairs.

KEY TO NORTH AMERICAN GENERA OF ORGERIINI

(Based on key of Ball and Hartzell, Annals Ent. Soc. of Amer., 1922)

1. Callosity behind eye; vertex elongate or angulate 2
   No callosity behind eye; vertex rounding or if elongate broad if seen from side 5
2. (1) Vertex elongate, with more than one-half its length beyond the eyes 3
   Vertex angulate, narrowing from the eyes, less than twice the length of the eyes ..... **Orgerius** Stal.
3. (2) Cephalic process truncate at the extremity, five angled 4
   Cephalic process as seen from side, beak-like, the apex obliquely rounding from above, the lower angle slightly produced ..... **Deserta** Ball
4. (3) Cephalic process gradually tapering as seen from top and side ..... **Orgamara** Ball
   Cephalic process parallel margined; apex as seen from the side slightly enlarged, projecting at an angle with the vertex ..... **Yucanda**, Ball and Hartzell
5. (1) Vertex angulate, produced in front of the eyes at least one-third its length 6
   Vertex broad and short, scarcely longer than its basal width; the lateral carinae of front closely margins the eye up to its juncture with the lateral margin of vertex 7
6. (5) Head twice the length of the eye as seen from the side widening toward the apex ..... **Acinaca** Ball and Hartzell
   Eyes contiguous to pronotum, head distinctly less than twice the length of the eyes, as seen from the side, distinctly narrowing and roundingly truncate ..... **Aridia** Ball and Hartzell
7. (6) Fore and middle tibia broadly foliaceous ..... **Timodema** Ball
   Tibia normal 8
8. (7) Lateral carinae of the frontal tablet uniting some distance below the apex of the head ..... **Ticidia** Uhl
   Lateral carinae of the frontal tablet narrowing but not uniting before joining the vertex ..**Timonidia** Ball and Hartzell

ORIGINAL DESCRIPTION OF THE GENUS ORGERIUS Stal 1859

Stahl, Carolus, Freg. Eugens. Resa, Omkring; Jorden; 1851-1859

Cephalic process short, broad at the base, tapering to an angular or slightly conical point, not truncate. The lateral carinae of the front rounding into median carina at the apex of the cephalic process. Oblique carina curving upwards from the eye, pustulate below; median carina extending to the apex. Eye separated from the pronotum by a diamond-shaped callosity. The anterior margin of the lateral tablets of pronotum transverse instead of inclined posteriorly. Carinae of scutellum sharply defined. Elytra brachypterous, irregularly reticulate. Abdomen obese, oval. Rostrum equalling the abdomen or slightly beyond. Anterior femora expanded three times the width of the tibia; post tibia flattened, inclined to be serrate, the serrations crowned with six to eight black spines.

KEY TO SPECIES OF GENUS ORGERIUS

1. Hind tibia distinctly flattened basally, the heavy spines appearing as serrations; lateral margins of vertex moderately or slightly elevated; lateral shoulders of pronotum elongate, their width greater than the central disk ---------- **rhyparus group** ----2

   Hind tibia not modified; lateral margins of vertex conspicuously elevated; lateral shoulder of pronotum abbreviated, narrower or only equal to width of central disk ---------- **minor group** ---- 13

2. (1) Vertex extended beyond eye a distance greater than half length of vertex; tegmina with reticulation indistinct ---------- 3

   Vertex extended beyond eye not over one-half the vertex length; reticulation of tegmina distinct (except in **spicatus**) ---------- 4

3. (2) Vertex with lateral margins gradually narrowing, its length extended beyond eye one-fifth longer than portion between eyes, its apex about one-third of its basal width ---------- **proprius** n. sp.

   Vertex with lateral margins abruptly constricted beyond eyes, extended in front of eye less than above, its apex about one-fifth of its basal width -- **triquestrus** n. sp.

4. (2) Vertex broad, short, length only a little longer than width, extended beyond eye distinctly less than half of its length, lateral margins scarcely elevated ---------- 5

   Vertex extended beyond eye approximately one-half or more than its greatest length; lateral margins elevated ---- 7

5. (4) Vertex narrowed at apex, width at apex about one-fifth of base ---------- **pajaronius** Ball and Hartzell

Vertex not as acutely narrowed, apical width more than one-fifth of base ---------- 6

6. (5) Apex width one-fourth of base; pronotum not deeply concave behind eye, lateral margins gradually sloping, lateral shoulder equal to width of median disk ---------- **bucculentus** n. sp.

Apex width one-third or more of base, pronotum deeply concave behind eye, lateral margins angulate, lateral shoulder wider than disk between carinae ---- **bilobatus** n. sp.

7. (4) Vertex slender, extended in front of eye a distance equal to three-fifths of its length ---------- **junceus** n. sp.

Vertex short, extended in front of eye approximately one-half of total length ---------- 8

8. (7) A large slender species, vertex width a little over half its length, basal lateral margins sub-parallel ---------- **concordus** Ball and Hartzell

Smaller, obese species, vertex heart-shaped, wider and with lateral margins outwardly curved ---------- 9

9. (8) Vertex more acutely narrowed, its width at apex one-fourth of basal width ---------- **rhyparus** Stal

Vertex broader, tip not narrowed, its apical width one-third of basal width ---------- 12

12. (9) Vertex longer, width five-eighths of length, lateral margins somewhat constricted before apex, reticulation of tegmina very indistinct ---------- **spicatus** n. sp.

Vertex broad, width three-fourths of length, lateral margins outwardly rounded, reticulation prominent ---------- **disgregus** n. sp.

13. (1) Lateral margins of vertex foliaceous, either bicornate or constricted before apex; lateral shoulder of pronotum equal or very slightly narrower than central disk ---- 14

Lateral margins of vertex little if any foliaceous, not constricted or bicornate; lateral shoulder distinctly narrower than central disk ---------- 15

14. (3) Vertex heart-shaped, lateral margins outwardly curved forming horns mesad of eye, greatest width four-fifths length; tegmina with longitudinal veins indistinct ---------- **bicornis** n. sp.

Vertex longer than above, acutely pointed, constricted just before apex, greatest width three-fifths length; tegmina with longitudinal veins distinct ------ **foliatus** n. sp.

15. (13) Vertex with apex moderately pointed, greatest width about two-thirds length; tegmina with reticulation very indistinct ---------- **ventosus** Ball and Hartzell

Vertex slightly broader than above, greatest width about three-fourths length; tegmina with reticulation distinct ---------- **minor Ball**

Orgerius rhyparus Stal 1859

Original Description

Orgerius rhyparus Stal Freg. Eugen. Resa Omkring Jorden 1851-1859

Dilute fusco-testaceous, maculis margines verticis parvis maculisque obsolestis inter carinas frontis fuscescentibus. Male Long. 5, lat. 3.5 millim. Tab. III p. 199 Magn. Auct; 9 a magn. nat; 9 b caput ab antico visum.

Patria, Cal. (San Francisco)

Author's Description

Size: Length from tip of head to tip of abdomen, male 5.0 mm. to 5.2 mm.; female 5.6 mm. to 6.2 mm. Greatest body width, male 2.8 mm. to 3.2 mm.; female 3.2 mm. to 3.7 mm.

Color: Color variable, a few specimens uniform rufous, the majority testaceous to fuscous with small dark spots. Lateral margins of vertex dotted with larger spots. Frons lighter, speckled uniformly with minute dots. Anteclypeus paler, frequently orange; dots paler or lacking. Postclypeus darker and heavily dotted. Pronotum fuscous with a row of spots around anterior margin; the reflexed ventral flap visible below showing the posterior half pale and without spots; anterior to which is a broad dark band, heavily speckled. Mesonotum fuscous, sometimes lighter than pronotum, uniformly spotted. Tegmina variable, in rufous specimens a reddish-tan, in the darker specimens sometimes deep fuscous, in others with inner half only darker. Abdomen fuscous uniformly speckled. Legs heavily speckled. Tarsi of all legs and spines on hind tibiae black. Tip of rostrum brown.

Structural Details: A median-sized obese species with a heart-shaped vertex, extending one-half of its length beyond eye and its width about five-eighths of its length. Vertex acutely narrowed at tip, parallel-margined or widening only slightly near the base, the lateral margins strongly foliaceous and elevated. Frons moderately long, only about one-fourth longer than greatest width of head across eyes. Tegmina, length and width equal, wing reticulation fine and uniform so that longitudinal veins are inconspicuous. Lateral lobe of ninth abdominal segment of the male, length and width equal, its dorsal margin a straight line terminating in a sharp arc then rounding to meet the eighth abdominal segment, this ventral margin equal in length to length of harpago showing beyond its tip.

Male Genitalia: Anal flap (tenth abdominal segment) narrow at base, the margin diverging to one-fourth distance from base, then running parallel and converging to form a broad, truncate tip. Tip

of stylus knob-like.

Harpago, as viewed from a flattened lateral view ovate with a slender, sharply pointed, cephalad-curving hook at middle of dorsal margin, just cephalad of which is another external hook which curves downward and slightly cephalad.

The aedeagal structure is complex and better understood by studying the diagram. Ventrad the theca is longer and divides apically into four frilled lobes which are shorter than in other species, dorsad the apical margin is bilobed. The only portions of the aedeagus showing are the tips of the long slender aedeagal hooks which become more sclerotized from the point of curving cephalad, while the basal half of the exposed hook is membranous.

Comparative Notes: The genus **Orgerius** in North America seems to fall roughly into three groups of species. The species making up the so-called **rhyparus** group are as follows: **rhyparus, junceus, concordus, pajaronius, bucculentus, bilobatus and disgregus.** The structural differences between these species are not striking for any one character but by summarizing the combined characteristics it is possible to separate them. The size of the vertex varies as follows: in **bucculentus** and **bilobatus** it is shorter than in any of the others, being only a trifle longer than wide and its margins are scarcely elevated; in **junceus** it is the longest, where it is a little greater than twice its width; in **concordus** its width is seven-tenths of its length; in **rhyparus, disgregus** and **pajaronius** it can be described as being heart-shaped and of moderate length, with their widths respectively five-eighths, three-fourths and eleven-sixteenths of their lengths. The general shape of the body varies with **bucculentus** being a short, broad and chubby species, **concordus** a large, slender ovate species, **junceus** slender but shorter than **concordus**, and **rhyparus, disgregus, bilobatus** and **pajaronius** moderately obese. Another character of importance is the lateral lobe of the ninth abdominal segment of the male. In **rhyparus** this lobe is smaller and more pointed than in the others although it is more closely related to **concordus** than the others. But these two species are easily distinguished by the larger size and longer vertex of **concordus.** A study of the diagram will indicate differences in these lateral lobes which are difficult to describe. These seven species also are distinguished by the male genitalia and again the differences are more readily understood by examining the drawings.

Distribution: Type locality of the species, San Francisco, California. One female from this locality was loaned for study by the National Museum and a rufous male specimen from Colfax, California. A series of five females and two males from Pacific, California, one female and two males from Towie, California, are in the Snow Entomological Collection.

Orgerius rhyparus var. clitellus Ball and Hartzell 1922

Original Description

Resembling var. **rhyparus**, large, obese forms with a testaceous color sharply set off by the shining black elytra. Described from three examples from Santa Margarita, Chico and Colfax, California. This variety was found with the preceding (**rhyparus**) and appears to be a still rarer adaptation to these dry, hot situations.

Comparative Notes: This variety does not seem to be valid in that the same coloring which is supposed to distinguish it has appeared in numerous other species, namely: **bilobatus, concordus, disgregus, bucculentus** and **pajaronius.**

Orgerius proprius n. sp.

Size: Length of body from tip of head to tip of abdomen, male 5.0 mm.; female 5.5 mm. Greatest body width, male 2.6 mm.; female 2.8 mm.

Color: Uniform testaceous with small but conspicuous dark spots. Vertex with two oblong brown spots near base, and with clusters of spots on lateral carinae especially near tip and others evenly scattered over disk. Frons with six light fuscous transverse, uniformly speckled bands, the four posterior ones broad and the two at apex narrower. Postclypeus light orange, tip heavily spotted, anteclypeus with three heavily spotted bands. Anterior area of pronotal flap darkened, heavily spotted, followed by an orange tinted light transverse band, the posterior margin again lightly speckled. Mesonotum evenly speckled. Posterior margin of tegmina with a row of large black spots, cells of tegmina with veins margined with uniform round dots. Abdomen evenly speckled. Legs heavily speckled. Tarsi of all legs brown. Spines on hind tibia black. Tip of rostrum black.

Structural Details: A slender species with a long vertex, less acutely pointed than in **triquestrus** but more acute than in some species. Vertex width a little over half its length, lateral margins moderately elevated, gradually sloping to apex, two depressed oblong spots between eyes. Frons elongate, about one-third longer than width of head across eyes. Tegmina with longitudinal veins and reticulation moderately distinct, cells fairly large. Body slender, its width approximately half the length of the body. Lateral lobe of ninth abdominal segment of male pointed, the dorsal margin convex thru middle then becoming slightly concave, tip a sharp arc and ventral margin slightly concave, the length of the harpago exposed beyond its tip about one-third of the latter. From a dorsal view these lobes are more distinct than in any other species and overlap the anal flap.

Male Genitalia: Anal flap (tenth abdominal segment) narrowed

at base, basal third with lateral margins parallel, then constricted through middle, again diverging through apical fourth, finally rounding to the narrow, round apex.

Harpago, as viewed from a flattened lateral view ovate with a slender, sharply pointed, cephalad-curving hook at middle of dorsal margin, just cephalad of which is a second external recurved hook.

Aedeagus at base a rectangular sclerotized plate, bilobed at base and bearing two large, sclerotized rods which run caudad, each of which terminates in a recurved arm, composed of a large membranous ball-shaped structure, partially covered by the theca, then becoming sclerotized, constricted for a short distance, again bulging slightly before the sharp finely pointed apex. On the dorsal side the posterior margin of the theca is straight. Ventrad the theca is longer and deeply bilobed.

Comparative Notes: This species in color and general body characteristics resembles the **rhyparus** group instead of the **minor** group. Together with **triquestrus** and **spicatus** it forms a small subgroup based on the lobe of the ninth abdominal segment of the male. For comparison of these three species see notes under the description of **triquestrus.**

From the **rhyparus** group **proprius** is distinguished by the much longer vertex with less elevated margins and the less distinct reticulation of the tegmina.

Location of Types and Distribution: Described from male holotype and female allotype, collected by R. H. Beamer from Mint Canyon, California, on July 6, 1933. Two male paratypes same data. One male paratype collected at Lompoc, California, by R. L. Sailer, August 7, 1938. These types are in the Snow Entomological Collection, University of Kansas.

Orgerius triquetrus n. sp.

Size: Length of body from tip of head to tip of abdomen, male 4.6 mm. to 4.9 mm.; female 4.5 to 5.0 mm. Greatest body width, male 2.5 mm. to 2.6 mm; female 3.0 mm. to 3.5 mm.

Color: Uniform rufous-tan with minute inconspicuous dark spots. Female slightly darker. Vertex with lateral margins outlined with clusters of speckles, the apical two pairs fused into a more pronounced solid spot. Frons cream-colored, speckles scattered or about seven partially speckled narrow bands indicated, these bands more pronounced at base and apex. Postclypeus light orange with faintly oblique lines; carinae and anteclypeus more speckled. Pronotum with carinae and lateral margins outlined with dark spots. Mesonotum somewhat more rufous. Longitudinal veins yellow, cells more or less fuscous with minute faint speckles, cells along posterior

margin brownish-black. Abdomen rufous-tan, a few scattered fuscous speckles, concentrated along posterior margin of the segments. Legs uniform rufous, heavily speckled, tip of spines on hind tibia black. Tarsi of all legs dark brown. Tip of rostrum dark brown.

Structural Details: A small slender species, characterized by a pronounced triangular vertex with apex forming an acute angle. Width of vertex a little more than one-half its length, lateral margins gradually elevated, median carina prominent. Frons elongate, narrower, about one-third longer than width of head across eyes. Tegmina varying from the **rhyparus** group by having thick longitudinal veins with the reticulations between faint, cells indistinct. General contour of body more ovate and slender than in some species, width of abdomen slightly less than one-half total length of body. Lateral lobe of ninth segment of male with length and width subequal, forming a sub-triangular plate with ventral margin at a right angle to body, dorsal margin roundingly curved to meet the ventral one just anterior to apex of anal flap, the length of the harpago showing beyond its tip only one-fourth of the ventral margin.

Male Genitalia: Anal flap (tenth abdominal segment) broad at base, parallel-margined for half its length, then converging suddenly in line with tip of stylus, then broadening before its regularly rounded apex. Stylus elongated, finger-like with roundingly pointed apex.

The harpago widely different from the **rhyparus** group, the ventral margin a smooth rounded curve, the basal half of dorsal margin reflexed, and bearing the two customary hooks, one located at the end of the reflexed margin and the other halfway between, the apices of both directed ventrad, the apical half of dorsal margin deeply arcuated thus narrowing the apical region to half the width at base.

The aedeagus is in the form of a sclerotized basal plate, somewhat U-shaped, the arms of the U curved inwardly, two slender sclerotized rods attached apically. The aedeagal rods hidden for most of their length by the thecal sleeve, the apical portion exposed beyond the thecal margin recurved, the middle region membranous and bulbous, beyond this formed into a sclerotized apex finely bifurcate at tip. On the dorsal side of the theca the apical margin is shallowly escalloped, ending just anterior to the membranous portion of the aedeagus. Ventrad the theca runs farther down terminating in a lobate-shaped curtain with frilled outer margin whose inner margin is split to a point somewhat above the membranous porton of the aedeagus.

(To be concluded in July issue)

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